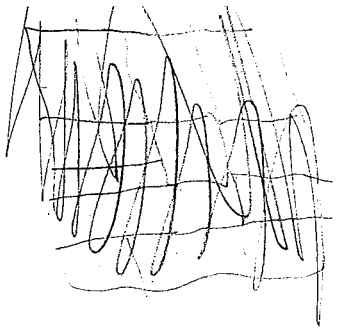
The following group of samples is for BREAKOUT # 3 at Nottawasaga.

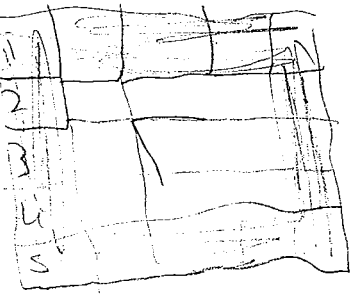
-to be used for ACTION activity
-each table of 4 will look at the 3 student samples (which are either all 3 correct, all 3 close or all 3 troublesome).
-the group will decide on feedback for each sample and general feedback for this 'group' of students for the following day
-each group of 4 will share their feedback with the 'whole group' using a document camera
-discussion will then move towards, "how do we help all of these diverse groups in our classroom" the next day?

The following samples are:

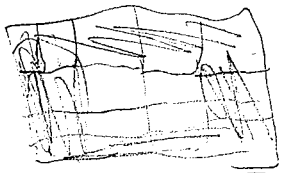
Correct



5x5
=16

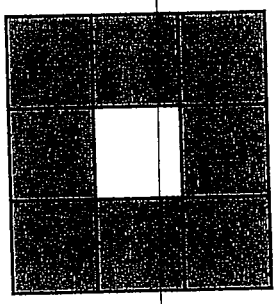


4x4
=12

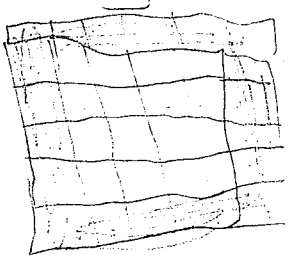


(2a) Perimeter Problem

3x3
=8



6x6
=20



Rule
(n4-4)
The rule is n4-4 because, 1 represents 4 each grid

proof
n4-4 = 17x4-4
=64

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

which is how many squares would be shaded.

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

Side length	Shaded squares
3 ~~5~~	8
4	12
5	16
6	20

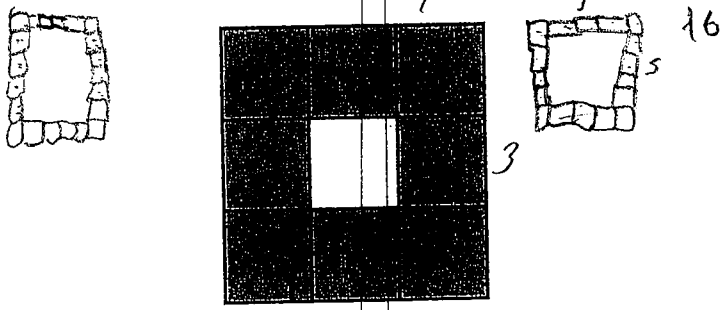
∴ as the number of sides increases by 1, the number of squares increases by 4.

$S = (x-1)x4$
$(17-1)x4$
16

"x"	
1	4
2	8
3	12
4	16
5	20
6	

0 4 10

(2a) Perimeter Problem



This is a 3x3 grid of squares with only the outside edge shaded.

∴ 8 Shaded Squares

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

∴ 16 Shaded Squares

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

64 Shaded Squares

If you had a grid of 100 squares, how many would be shaded?

396 Shaded Squares

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

the rule is subtracte 1 from the number of sides then multiple 4. I know from my graph

ex $y=(x-1)4$
$=(11-1)4$
$=(10)4$
$=40$

∴ a 11x11 square has 40 shadded squares

$x^2 - (x-2)^2$

1) let x = the amount of squares by squares you want

$x^2 - (x-2)^2 = 5^2 - (5-2)^2$

$= 25 - (3)^2$

$= 25 - 9$

$= 16$

∴ there will be 16 outer-squares

2) let x = the amount of squares by squares you want

$x^2 - (x-2)^2 = 17^2 - (17-2)^2$

$= 289 - (15)^2$

$= 289 - 225$

$= 64$

∴ there will be 64 outer squares

3) let x = the amount of squares by squares you want

$x^2 - (x-2)^2 = 100^2 - (100-2)^2$

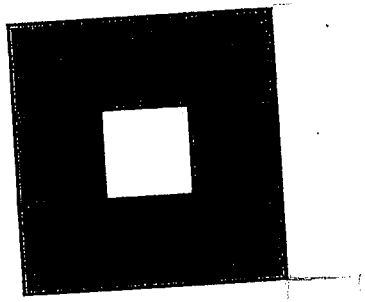
$= 10000 - (98)^2$

$= 10000 - 9604$

$= 396$

∴ there will be 396 squares shaded

(2a) Perimeter Problem



This is a 3x3 grid of squares with only the outside edge shaded.

1) If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

2) If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

3) If you had a grid of 100 squares, how many would be shaded?

4) What is the rule? How do you know? Can you explain your rule? Can you give evidence?

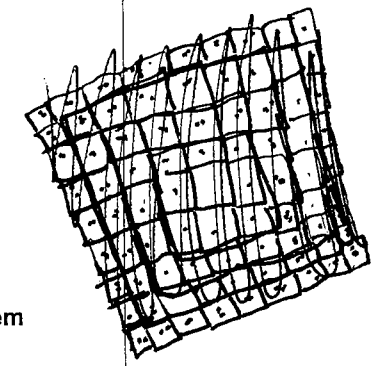
4) the rule is $x^2 - (x-2)^2$.

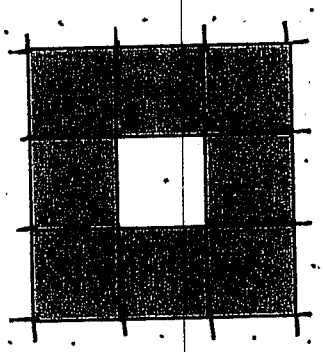
over →

The following samples are:

Correct

(2a) Perimeter Problem





8 > 8
16 > 8
24 > 8
32 > 8

size	outer □'s
3x3	8
5x5	16
7x7	24
9x9	32
1x1	4

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

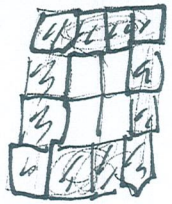
If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

5x5=16 the outer squares are equal to the first dymention shown subtract one multiplied by four

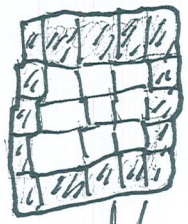
OS=(D-1)x4
OS=(100-1)x4
=99x4 =396

4x4



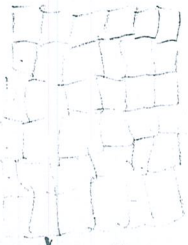
10

5x5



16

22



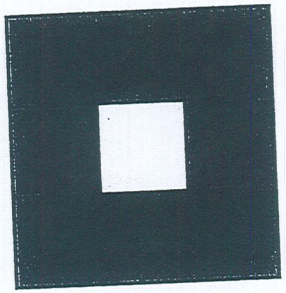
6x6

7x7=28

(2a) Perimeter Problem

So 3x3 has 8

3x3



$d(2)+(d-2)2$

$=3(2)+(3-2)2$

$=6+2$

$=8$

. . .

if works!

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

The general rule I found is $d(2)+(d-2)2$

where d is the dimension of one side

dimensions	outside edges
1x1	1
2x2	4
3x3	8
4x4	12
5x5	16
6x6	20
7x7	24
8x8	28

dimension(2) + (dimension-2)2

and You get the correct answer for each one!

$4(4)=16$

$16-4=12$

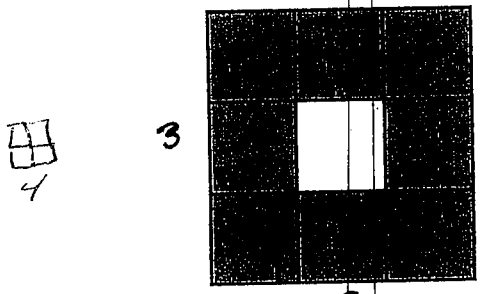
$5(4)=20$

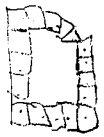
$20-4=16$

$6(4)=24$

$24-4=20$

(2a) Perimeter Problem





This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? 16

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? $y=4x-4$ $=4(17)-4$ $=68-4$ $=64$

If you had a grid of 100 squares, how many would be shaded? $y=4x-4$ $=4(100)-4$ $y=400-4$ $=396$

What is the rule? How do you know? Can you explain your rule? ~~Can you give evidence?~~

$y=4x-4$

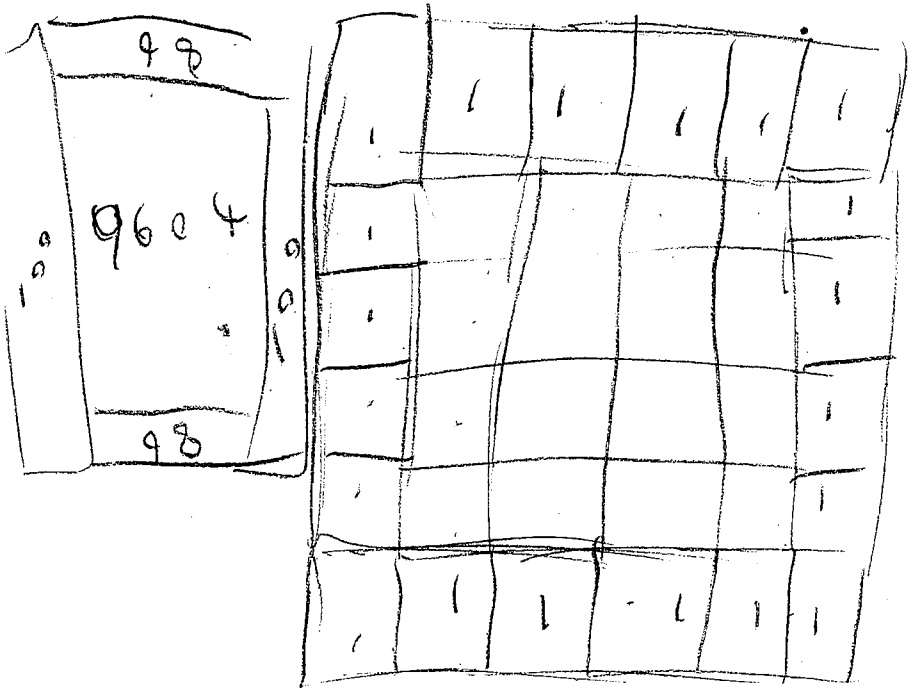
3x3	8
4x4	12
5x5	16
6x6	20

The rule is $4x-4$ because in the graph each first difference is 4 (4x) So if you times 4(3) it equals 12. And you minus 4

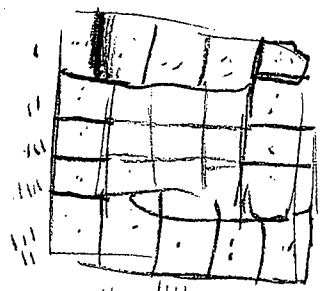
The following samples are:

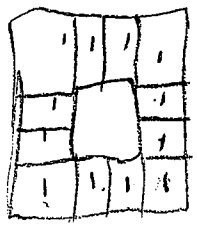
Close – they have elements of correctness, but some errors.

98
98
196

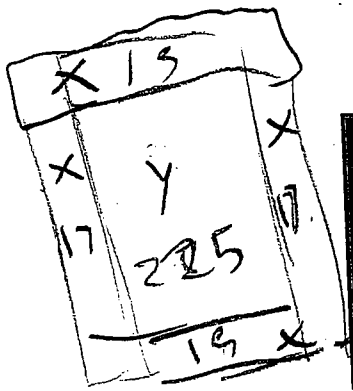


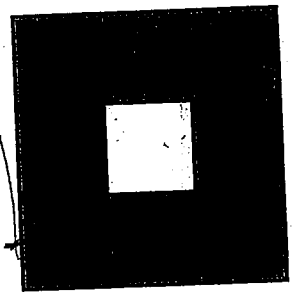
2
17
17
15
15
64





(2a) Perimeter Problem





178
4817
9776
16420

15
15.2
75
150
15 x 15
225

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? 16 would be shaded

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? 64 would be shaded

If you had a grid of 100 squares, how many would be shaded? 396 would be shaded

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

* = length of four sides in cubes

y = # of unshaded interior cubes

$x - 2 = y$

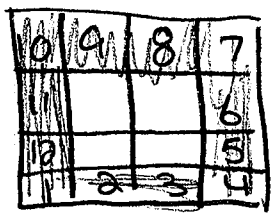
$x4 - (x2 - 4) = 5$

$y \times y = US$

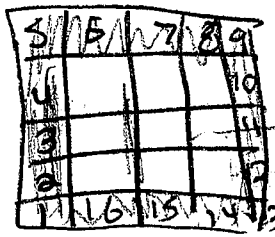
US = # of unshaded cubes
S = # of shaded cubes

98
98
784
8820
9604

Evidence

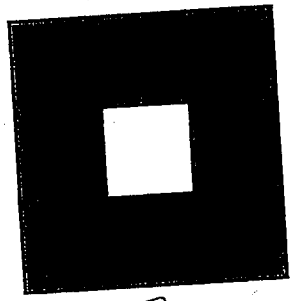


4



5

(2a) Perimeter Problem



3

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? 16

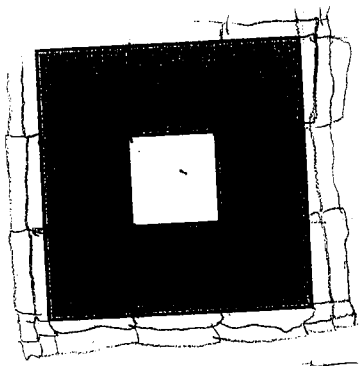
If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? 64

If you had a grid of 100 squares, how many would be shaded? 400

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

The rule (equation) is $S=(n-1)4$ where n is the the length of one side of the grid and S is the number of squares shaded. I know this because each time the number of squares shaded is a multiple of 4, that starts at 8 at 3 and increases each time by 4.

(2a) Perimeter Problem



$N = (T)(3)+1$

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? there would be 16 shaded areas

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? There would be 52 tiles

If you had a grid of 100 squares, how many would be shaded? 25x4

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

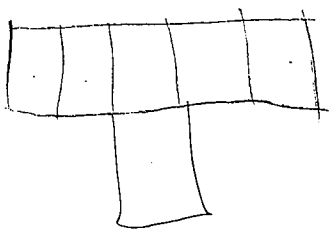
$N = (17)(3)+1$

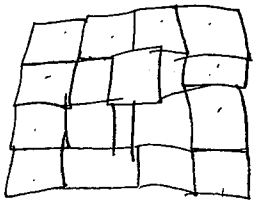
$= 52$

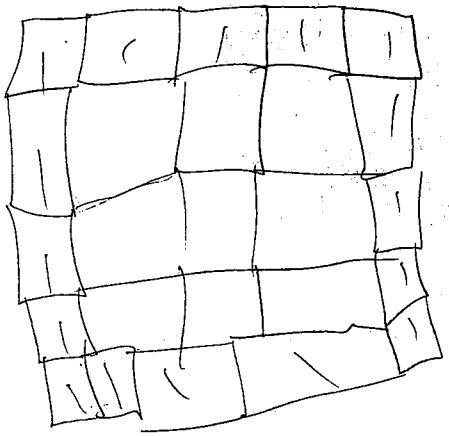
$N = (T)(3)+1$

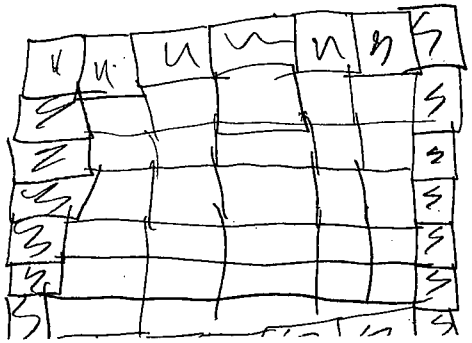
The following samples are:

Close – they have elements of correctness, but some errors.

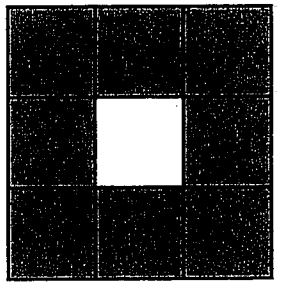








(2a) Perimeter Problem



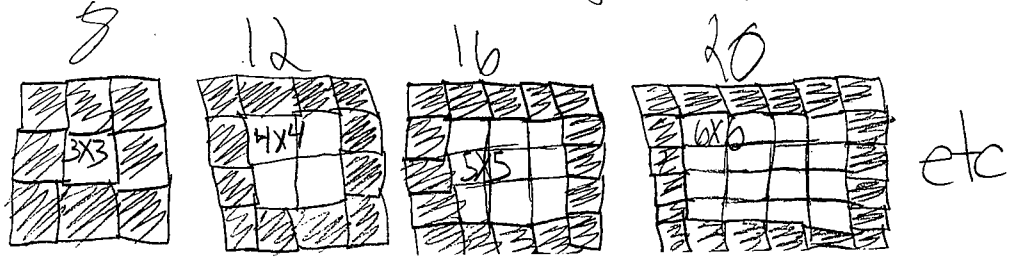
This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? 16

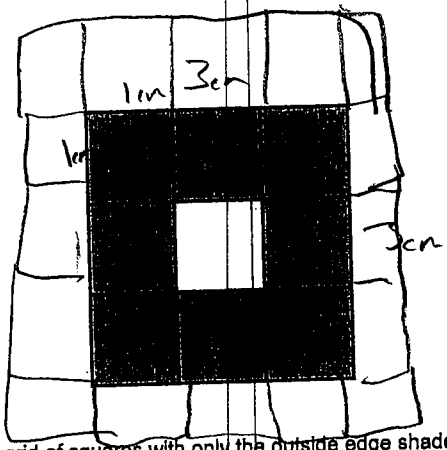
If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? 24

If you had a grid of 100 squares, how many would be shaded? 36

What is the rule? How do you know? Can you explain your rule? Can you give evidence? everytime you increase the Squares lenght and width the number of shaded squares goes up by 4



(2a) Perimeter Problem

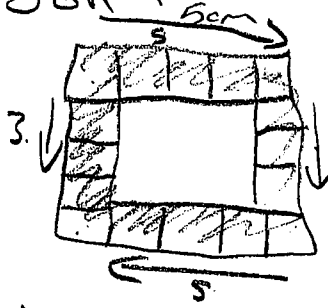


This is a 3x3 grid of squares with only the outside edge shaded.

1. If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?
2. If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?
3. If you had a grid of 100 squares, how many would be shaded?
4. What is the rule? How do you know? Can you explain your rule? Can you give evidence?

Work on back side.

1. Only 5 on the top and bottom. and 3 on the sides because



2. 64

3. 23.

4.

formula.

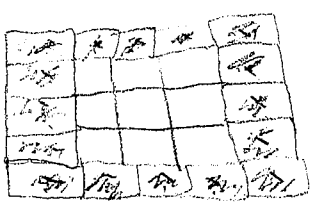
# of squares = ((one of sides)(4) − 4.) one of

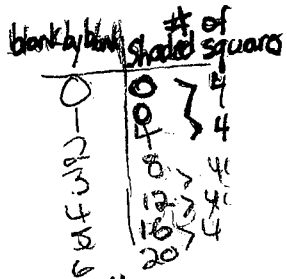
ex 17x17

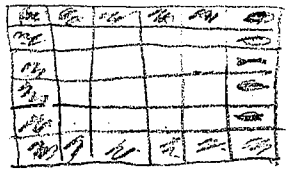
= 17(4) − 4

= 68 − 4

= 64 number of squares

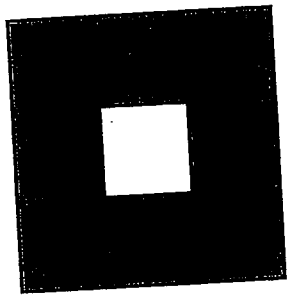






∴ $y = 4x$

(2a) Perimeter Problem



This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

If I had a 5x5 grid 16 squares would be Shaded.

$y = 4x$

$\frac{100}{4} = \frac{4x}{4}$

$25 = x$

$y = 4x$

$y = 4(17)$

$y = 68$

∴ there would be 68 square shaded for a 17x17 square

If you had 100 squares there would be 25 shaded

This says

$25 = x$

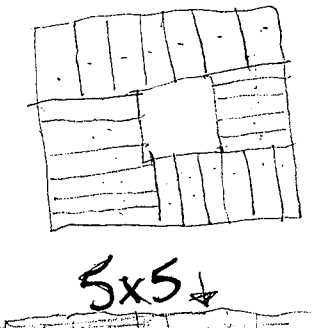
If you had 100 squares, there would be 25 shaded.

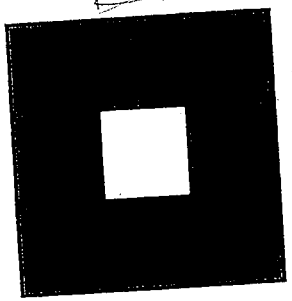
The following samples are:

Close – they have elements of correctness, but some errors.

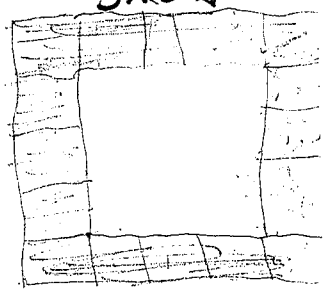
Dimension	Shaded
3x3	8
5x5	16
7x7	24
9x9	32

7x7





5x5



(2a) Perimeter Problem

This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

You take the Dimensions and -1x4

So 3x3 - 1 = 2x4 = 8 Shaded squares

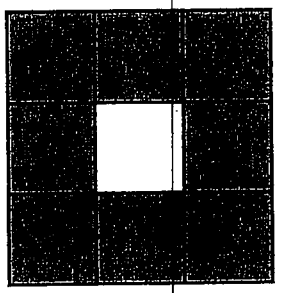
5x5 - 1 = 4x4 = 16 Shaded Squares

3
99
4
396

∴ 100 - 1 = 99x4

= 396 Shaded Squares (5n-1)4

(2a) Perimeter Problem



This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? 16

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? 64

If you had a grid of 100 squares, how many would be shaded? 36

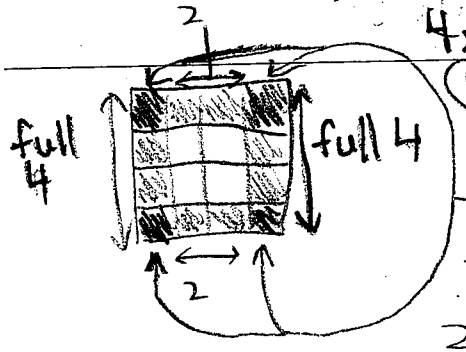
What is the rule? How do you know? Can you explain your rule? Can you give evidence? 4(5)-4

4(5)-4
20-4
16

4(17)-4
68-4
64

4x4
12

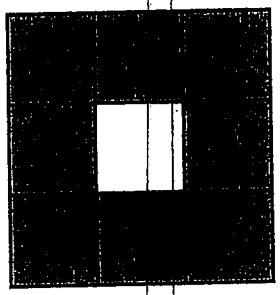
45-4



2+2+4+4=12

(2a) Perimeter Problem

over



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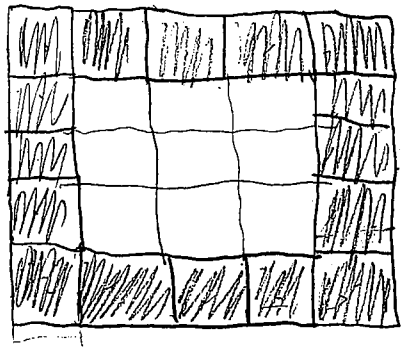
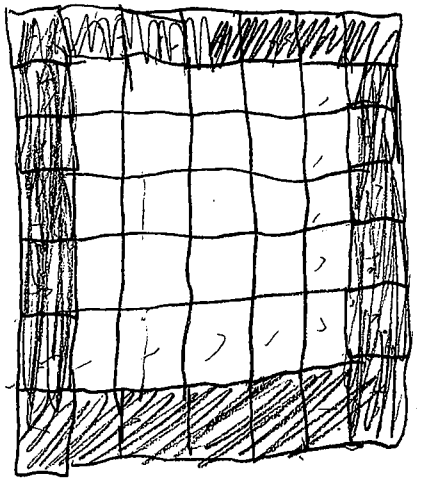
If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?





For a 17x17 grid there would be 56 squares shaded.

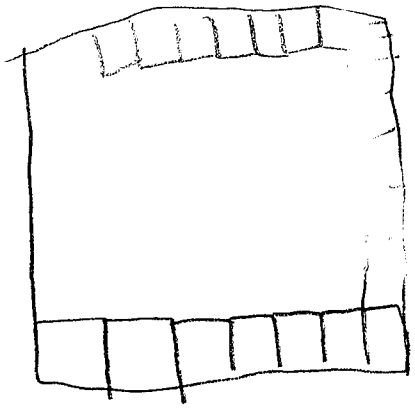
For a 100 square grid, there would be

# Squares	# Shaded
5	8
7	16
9	24
11	32
13	40
15	48
17	56
100	

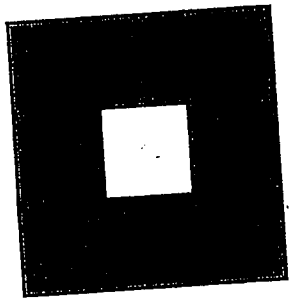
For every odd number, there is 8 more shaded squares.

The following samples are:

Problematic– the students either didn't grasp the problem or had significant difficulty



(2a) Perimeter Problem



This is a 3x3 grid of squares with only the outside edge shaded.

If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded? 18

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded? 66

If you had a grid of 100 squares, how many would be shaded? 38

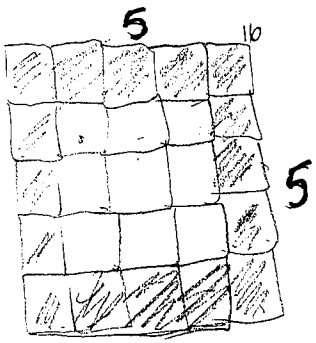
What is the rule? How do you know? Can you explain your rule? Can you give evidence? all you do is add up the number of square on the outside than minus 4

ex) 5x5 grid $(n+2)-4$

$5+5+5+5$

$=20-2$

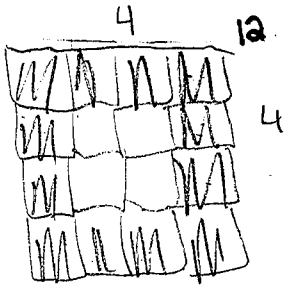
$=18$

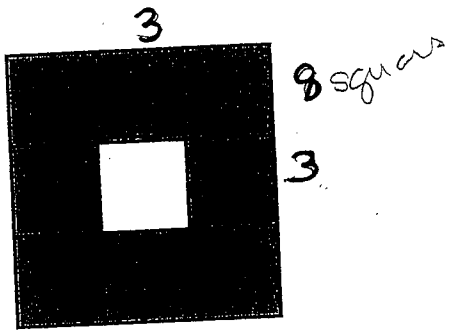


• If I had a 5 by 5 square, 16 boxes would be shaded.

Outside	Squares
3x3	8
4x4	12
5x5	16
6x6	20
7x7	24

(2a) Perimeter Problem





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If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

The rule is:

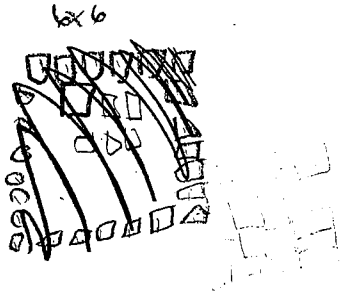
I am confused with trying to find the equation

I got confused because I'm not sure what I am supposed to be looking for, at first I thought you would times than take away one

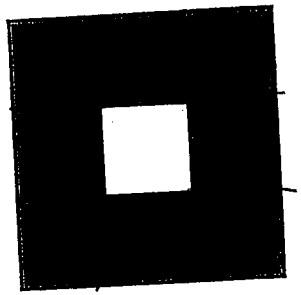
ex) $3 \times 3 = 9 - 1 = 8$

but than as I went to 6x6 I realized it did not work anymore. So I am not quite sure what to look for in the problem any more other than a patterrn withe the squares.

3x3 9
4x4 16
5x5 25
6x6 36



(2a) Perimeter Problem



turn to back

This is a 3x3 grid of squares with only the outside edge shaded. 8

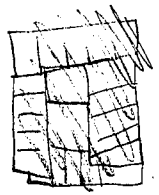
If you had a 5x5 grid of squares where only the outside edge of squares is shaded, how many squares would be shaded?

If you had a 17x17 grid of squares with only the outside edge of squares shaded, how many squares would be shaded?

If you had a grid of 100 squares, how many would be shaded?

What is the rule? How do you know? Can you explain your rule? Can you give evidence?

5x5



3x3=9
5x5=25
17x17=289